Best Practices for PPA Modification of Asphalt

Published in Cooperation of the Polyphosphoric Acid Producers in the US

- Innophos
- ICL Performance Products
Contents

- General Considerations
- PPA level selection
- Conclusion
PPA in Asphalt Paving
12 Years and Counting…

- Over the last 5 years – estimated 200 million tons of asphalt mixes containing PPA – about equivalent to 3,000 miles of 2” thick 2-lane highways

- No failures identified

- PPA has achieved user expectations for more than a decade
General Considerations

- PPA is Polyphosphoric Acid. Contains no water
- Base Asphalt Selection
- PPA Level Selection
- Anti-Strip Selection
- Use in an Asphalt Plant
- Additional Testing
Base Asphalt Selection

- Low temperature properties are determined mainly by the base asphalt.
- PPA, when used alone, generally provides high temperature improvement.
- Co-modification with polymers is more complex, with improvements at both high and low ends a possibility.
PPA Level selection

**BINDER**

Step 1

- **PPA%**: 1% to 1.5%
  - 0.5 to 1%
  - 0.2 to 0.5%

**WO**

- 2 grades

**With Polymers**

- 1 grade
- 1/2 grade

**PG**

- 1 grade
- 2 grades

**MIX**

Step 2

Moisture resistance tests pass/failed
With or without compatible antistripping agent
Anti-Strip Selection

- Anti-strip additives should be tested with PPA. Some amine agents are not compatible with PPA and should not be used.

- Generally, a DSR test of binder with PPA and anti-strip at the PG spec temperature will be sufficient.

- Best Practices document includes a current list of anti-strip agents that have been found to be compatible.

- Properties of final binder formulation and mix should be tested and verified.
Use of PPA in an Asphalt Plant

Both suppliers have in house expertise to assist in the proper design of storage, pumping, and metering equipment.
Conclusions

The Best Practices document has been published in cooperation between the Polyphosphoric Acid Producers in the US, ICL Performance Products and Innophos, working with the Phosphate Forum of the Americas.

This document is our best effort to provide manufacturers, specifiers and users, with a thorough guide to the proper use of PPA in asphalt modification, to the best of our current knowledge.
NOTICE: Although the information and recommendations set forth herein (hereinafter “Information”) are presented in good faith and believed to be correct as of the date hereof, the authors make no representations or warranties as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will the authors be responsible for damages of any nature whatsoever resulting from the use of or reliance upon Information or the product to which Information refers. Nothing contained herein is to be construed as a recommendation to use any product, process, equipment or formulation in conflict with any patent, and the authors make no representation or warranty, express or implied, that the use thereof will not infringe any patent. No representations or warranties, either express or implied, or merchantability, fitness for a particular purpose or of any other nature are made hereunder with respect to information or the product to which information refers.

ICL Performance Products LP
Innophos, Inc.

April 2009